system less than 1 μm thick on the recording layer, between the recording layer and the flying optical head, the coating system having at least one layer whose thermal conductivity prevents a surface temperature from occurring when the recording layer is heated by the optical beam which can cause evaporation of molecules adsorbed therein from an ambient atmosphere.

REMARKS

In response to the Office Action mailed October 3, 2001, the Applicants respectfully request reconsideration. To further the prosecution of this application, amendments have been made in the claims. The claims as now presented are believed to be in allowable condition.

Claims 1-31 were previously pending in this application. Claims 1, 2, 5, 6, 11-13, 21 and 25 have been amended. Claims 1-31 are pending for examination, of which claims 1, 11, 21 and 25 are independent.

Rejections under 35 U.S.C. §112

Claims 1-20 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Claims 1, 2, 5, 6, 10, 12, 13, 21 and 25 have all been amended to correct indefiniteness.

The Examiner found the phrase "low enough thermal conductivity" used in claim 1 to be indefinite. This phrase has been deleted.

In claims 1 and 11, the Examiner found the phrase "no significant physical evaporation" to be indefinite because significant is considered to be a relative term. The phrase has been deleted.

In claim 2, the Examiner found the term "desorption" to lack antecedent basis. The claim now recites "a desorption temperature," correcting the antecedent issue.

In claim 6, the Examiner found the phrase "metal reflector layer" to lack antecedent basis. Claim 6 has been amended to recite "the optical disk of claim 1, further comprising a metal reflector layer."

Finally, in claim 13, the phrase "high thermal conductivity" has been found to be indefinite. Claim 13 has been amended to recite "a thermal conductivity that substantially dissipates heat that reaches the surface when optical energy impinges on the recording layer." The phrase is now clear

and definite because it clearly defines the thermal conductivity required in terms of measurable physical parameters of system performance.

In addition to the amendments discussed above in connection with the Examiner's rejections, claim 5 has been amended to change the phrase "the protective layer" to "the protective overcoat layer" to ensure antecedent basis for the element recited.

Claims 1-20 are now clear and definite, meeting all the requirements of 35 U.S.C. §112, second paragraph.

Rejections under 35 U.S.C. §103(a)

Claims 1-3, 5-6, 8 and 10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Buckingham et al., U.S. Patent No. 5,168,031, in view of Rosen et al., U.S. Patent No. 5,761,188. Claim 1 has been amended, overcoming this rejection.

Buckingham discloses a recording layer, a first dielectric layer and a protective overcoat layer. However, Buckingham's disclosure is totally devoid of and absent the properties and parameters disclosed and claimed in the present application. Buckingham fails to recognize the importance of the temperature at the protective layer surface. To this, Rosen et al. adds a discussion of thermal conductivity that leads one away from the structure claimed because the choice of thermal conductivity advocated by Rosen et al. is totally driven by the desire to obtain specific mechanical and thermal performance at the recording layer 53. Rosen et al. thus teach using a layer with a very low thermal conductivity, as stated at col. 8, ll. 23-24, referring to layers 51, 59, while internal layers 55, 57 should have high thermal conductivity for heat dissipation purposes, as stated at col. 8. ll. 24-25. None of the layers whose thermal conductivity is discussed is in a position where adsorption or desorption of material from an ambient atmosphere can occur.

In contrast, the present inventor has recognized an importance of the temperature at the protective layer surface to protect the substrate 50 from high read/write temperatures clearly different from and not understood by either of the cited references. The present inventor recognized that the surface temperature affects whether the protective overcoat layer or other materials adsorbed therein from an ambient atmosphere are desorbed where they can contaminate the flying head optics. See, for example, page 6, lines 24 – page 7, line 5 of the present application. Language

specifically directed to material parameters producing this useful property is included in the claims. Claim 1 now recites "a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere then absent the read/write operations." Nothing in the cited combination teaches selecting the thermal conductivity to prevent evaporation of the protective layer or to prevent evaporation of adsorbed molecules.

Claims 1-3, 5-6, 8 and 10 are therefore patentable over the combination of Buckingham et al. and Rosen et al.

Claims 1-5, 7 and 9-31 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Rosen et al. in view of Lee et al., U.S. Patent No. 5,729,393.

Each of the independent claims, 1, 11, 21 and 25, recite features that prevent evaporation of the protective overcoat layer or adsorbed molecules from the surface of the medium during read and write operations. Neither Rosen et al. nor Lee et al. addressed the evaporation issue at all. Hence, the references do not, either alone or in combination, teach or suggest the combinations recited in the independent claims.

Claims 1, 11, 21 and 25 are therefore patentable over Rosen et al. in view of Lee et al. The remaining claims rejected are dependent claims, patentable for at least the same reasons as discussed above in connection with the independent claims.

CONCLUSION AND REQUEST FOR RECONSIDERATION

Reconsideration of claims 1-31 is respectfully requested.

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,

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Docket No.: D00532/70031 GSE
Date: March 4, 2002
x03/03/02x

MARKED-UP SPECIFICATION

Please replace the paragraph beginning at line 14 of page 1 as follows:

Various patents to date have taught optical systems including solid immersion lenses and systems of lenses employing near-field effects carried on the body of a slider to achieve high linear density. For example, see Corle et al. (U.S. Patent No. 5,125,750), Mamin et al. (U.S. Patent No. 5,497,359), and [Berg] Lee et al. (U.S. Patent No. 5,729,393).

MARKED-UP CLAIMS

1. (Amended) An air-incident optical recording medium [having] compatible with a flying optical head, comprising:

a recording layer sensitive to modulation and readout by an optical beam [which can be used with a] directed through the flying optical head; and[, comprising:]

a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations; including

a first dielectric layer disposed on the recording layer,[;] and

a protective overcoat layer disposed on the first dielectric layer.[;

wherein at least one of the first dielectric layer and the protective overcoat layer have a low enough thermal conductivity that a surface temperature is maintained at a surface of the medium such that no significant physical evaporation of the protective overcoat layer or evaporation of adsorbed molecules from an ambient atmosphere occurs during read and write operations.]

2. (Amended) The optical disk of claim 1 where the first dielectric layer and the protective overcoat layer keep the surface temperature less than [the] a desorption temperature of water during read and write operations.

5. (Amended) The optical disk of claim 1 where the protective overcoat layer is a lubricant.

6. (Amended) The optical disk of claim 1 further comprising a metal reflector layer and [where] a third dielectric layer [is added] between the metal reflector layer and the substrate.

11. (Amended) An air-incident optical disk compatible with a flying optical head, comprising: [having]

a phase change recording layer where the reflectivity difference between the amorphous and crystalline states are utilized for mark formation; and[, the disk used with flying optical heads, comprising:]

a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations; including

a first dielectric layer,[;] and

a protective overcoat layer.[;

wherein when the phase change recording layer experiences a temperature sufficient to cause transformation to an amorphous state, a surface of the disk on which optical energy impinges experiences a temperature such that no significant evaporation of the protective overcoat layer and no significant evaporation of adsorbed molecules from ambient atmosphere occur.]

12. (Amended) The optical disk of claim 11 where the first dielectric layer and the protective overcoat layer keep the surface temperature less than the desorption temperature of water [during read and write operations] when optical energy impinges on the recording layer.

13. (Amended) The optical disk of claim 11 such that the protective overcoat layer has a [high] thermal conductivity that substantially dissipates [to dissipate] heat that reaches the surface when optical energy impinges on the recording layer.

21. (Amended) An optical recording system comprising of an air-incident optical disk compatible with flying optical heads, in which the recording layer is separated from a surface of the disk by intervening layers of a total thickness less than about 1 μm and a

composition such that the highest temperature of the surface during normal operation is less than the desorption temperature of water;

a flying optical head where the lowest facet of the lens element of the flying optical head is supported to float in close proximity to the surface of the disk and where the optical focus of the flying head is at the recording layer;

means of delivering a beam of light to the optical head so as to raise the recording layer to a temperature exceeding about 250°C;

means of optically detecting and differentiating the presence and absence of the mark as seen by the optical beam;

and tracking detection and feedback means to ensure that the optical beam can follow the path of the marks.

25. (Amended) In an air-incident optical recording medium which can be used with a flying optical head, the recording medium including a recording layer sensitive to heat produced by an optical beam which raises the recording layer to a temperature exceeding 250°C, a coating system less than 1 μm thick on the recording layer, between the recording layer and the flying optical head, the coating system having at least one layer whose thermal conductivity prevents a surface temperature from occurring when the recording layer is heated by the optical beam which can cause evaporation of molecules adsorbed therein from an ambient atmosphere.